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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/866,414	05/25/2001	Fred Discenzo	01AB121	6236

7590 07/12/2006

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ART UNIT	**PAPER NUMBER**
2154	

DATE MAILED: 07/12/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

Application Number: 09/866,414
Filing Date: May 25, 2001
Appellant(s): DISCENZO ET AL.

MAILED

JUL 1 2 2006

Technology Center 2100

Carlos P. Garritano
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 4/13/06 appealing from the Office action mailed 10/6/05.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6260004	**Hays**	**7-2001**
6369472	**Grimm et al.**	**4-2002**
5419197	**Ogi et al.**	**5-1995**
5640103	**Petsche et al.**	**6-1997**
4933834	**Gotou et al.**	**6-1990**

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

1. **Claims 1-7, 10, 11, 15, 31-34, 36, 37, 41-43, 45-47, 49, 53-55 and 57-59** are rejected under 35 U.S.C. 103(a) as being obvious over Hays (US 6,260,004 B1), hereinafter Hays, in view of Grimm et al. (US 6,369,472 B1), hereinafter Grimm.

2. As for claims 1 and 32, Hays discloses a diagnostics and control system for controlling a motorized system and diagnosing the health thereof, comprising:

a controller (micro-controller/PID controller 188, Fig. 4a) that conveys a control signal to a motor drive (12, 14, fig. 1) to operate the motorized system (10, fig. 1) in a controlled fashion (col. 14, line 55 – col. 15, line 15); and

a diagnostics system (diagnostic apparatus 24 includes motor vibration sensor 86, rotating machine seal leakage detector or sensor 94, oil contamination sensor 96,

viscosity degradation sensor 98, torque sensor 100, corrosion sensor 104, ultrasonic thickness sensor 106, accelerometer 108; col. 13, line 7 – col. 14, line 7) integrated with the controller (micro-controller/PID controller 188, Fig. 4a; col. 14, line 55 – col. 15, line 15) and the motor (motor or rotating machine, 12, 14, fig. 1) to comprises a single unit (fig. 1) that diagnoses the health of the motorized system according to a measured attribute associated with the motorized system, the diagnostics system providing a diagnostics signal to the controller (col. 6, lines 23-42, "The system apparatus...reducing pump wear."; col. 20, lines 65-68, "If diagnostic information...increases pump life.").

7. Hays discloses a diagnostics system (diagnostic apparatus 24 includes motor vibration sensor 86, rotating machine seal leakage detector or sensor 94, oil contamination sensor 96, viscosity degradation sensor 98, torque sensor 100, corrosion sensor 104, ultrasonic thickness sensor 106, accelerometer 108; col. 13, line 7 – col. 14, line 7) integrated with the controller (micro-controller/PID controller 188, Fig. 4a; col. 14, line 55 – col. 15, line 15) and the motor (motor or rotating machine, 12, 14, fig. 1) to comprises a single unit (fig. 1). Grimm also discloses a diagnostics system integrated with the controller and the motor drive to comprises a single unit (20, fig. 1; col. 2, lines 27-32; col. 2, line 44 – col. 3, line 35; col. 4, claims 16; col. 5, claim 17). It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Hays and Grimm because Grimm's integration of controller, motor and diagnostics would optimize the performance of arrangement of the system by

accurately diagnosing problems and predicting the future state of the system based on operating characteristics of the electric motor (Grimm, col. 1, lines 5-11; col. 2, lines 27-32).

8. As for claim 2, Hays discloses the diagnostics and control system of claim 1, the measured attribute comprises at least one of vibration, pressure, current, speed, and temperature (col. 1, lines 40-65, "Vibration monitoring equipment...called an 'orbit.'"; "col. 10, line 49 - col. 11, line 29, "Diagnostics apparatus 24...computing device 38."; vibration sensor 80, Fig. 1; col. 12, lines 63-66, "Machine sensors may...rotating equipment 14.").

9. As for claim 3, Hays discloses the diagnostics and control system of claim 1, the motorized system comprises a motor and a load, and the load comprises at least one of a valve, a pump, a conveyor roller, a fan, a compressor, and a gearbox (col. 6, lines 46-57, "Thus, the present invention...equipment monitoring variables.").

10. As for claim 4, Hays discloses the diagnostics and control system of claim 1, the diagnostics system provides a diagnostics signal according to the health of the motorized system, and the controller provides a control signal to the motorized system according to at least one of a setpoint and the diagnostics signal (col. 14, lines 45-62, "In one embodiment...to rotating machine 14.").

11. As for claim 5, Hays discloses the diagnostics and control system of claim 1, the measured attribute comprises at least one vibration signal obtained from a sensor associated with a motor in the motorized system (vibration sensor 80, Fig. 1; col. 12, lines 63-66, "Machine sensors may...rotating equipment 14."; col. 13, lines 7-12, "Diagnostic apparatus 24...variables thereto.").

12. As for claim 6, Hays discloses the diagnostics and control system of claim 5, the diagnostics system is adapted to diagnose the health of at least one of a motor bearing, motor shaft alignment, and motor mounting according to the measured vibration (col. 13, lines 7-12, "Diagnostic apparatus 24...variables thereto.").

13. As for claim 7, Hays discloses the diagnostics and control system of claim 6, the diagnostics system performs frequency spectral analysis of the vibration signal (col. 24, lines 31-55, "Referring to Fig. 16...by box 1614.").

14. As for claim 10, Hays discloses the diagnostics and control system of claim 1, The motorized system comprises a motorized pump, the measured attribute comprises at least one vibration signal obtained from a sensor associated with the pump, and the diagnostics system is adapted to diagnose the health of the pump according to the measured vibration (col. 12, lines 63-66, "Machine sensors may...rotating equipment 14."; col. 13, lines 7-12, "Diagnostic apparatus 24...variables thereto.").

15. As for claim 11, Hays discloses the diagnostics and control system of claim 10, the diagnostics system is adapted to perform frequency spectral analysis of the vibration signal (col. 24, lines 31-55, "Referring to Fig. 16...by box 1614.").

16. As for claim 15, Hays discloses the diagnostics and control system of claim 1, the motorized system comprises a motorized pump, the measured attribute comprises a current associated with a motor in the motorized system, and the diagnostics system provides a diagnostics signal indicative of pump cavitation according to the measured current (col. 8, lines 44-48, "The method is based...wear and tear."; col. 13, lines 13-18, "By receiving data...impending maintenance.").

17. As for claim 31, Hays discloses the diagnostics and control system of claim 1, the diagnostics system comprises at least one of a neural network, an expert system, and a data fusion component (col. 4, lines 27-52, "MARINTEK has undertaken...for pump maintenance.").

18. As for claim 33, Hays discloses the method of claim 32, further comprising providing a diagnostics signal indicative of the health of the motorized system, operating the motor comprises controlling the motor according to at least one of a setpoint and the diagnostics signal (col. 14, lines 45-62, "In one embodiment...to rotating machine 14.").

19. As for claim 34, Hays discloses the method of claim 33, further comprising

measuring an attribute associated with the motorized system, providing the diagnostics signal comprises obtaining a frequency spectrum of the measured attribute and analyzing the frequency spectrum in order to detect at least one fault in the motorized system (col. 24, lines 31-55, "Referring to Fig. 16...by box 1614.").

20. As for claim 36, Hays discloses the method of claim 32, diagnosing the health of the motorized system according to a measured attribute associated with the motorized system comprises:

providing the measured attribute to at least one of a neural network, an expert system, and a data fusion component (col. 4, lines 41-52, "Recent published research...for pump maintenance."); and

providing a diagnostics signal indicative of the health of the motorized system from the at least one of a neural network, an expert system, and a data fusion component (col. 4, lines 41-52, "Recent published research...for pump maintenance.").

21. As for claim 37, Hays discloses the method of claim 36, operating the motor comprises controlling the motor according to at least one of a setpoint and the diagnostics signal (col. 14, lines 55-62, "In another embodiment...to rotating machine 14.").

22. As for claims 41 and 42, Hays discloses an integrated control and diagnostics

system for a motor, the system comprising:

a diagnostics module to generate a health assessment signal indicative of the health of the motor (computer 38, Fig. 1; col. 6, lines 23-42, "The system apparatus...reducing pump wear.");

a controller integrated with the diagnostics module and coupled to a motor device, the controller outputting a driving output based on the health assessment signal, the driving output is applied to the motor device (micro-controller/PID controller 188, Fig. 4a; col. 6, lines 23-42, "The system apparatus...reducing pump wear."), the motor drive and the controller integrated with the diagnostics module form an indivisible unit.

23. As for claim 43, Hays discloses the control and diagnostics system according to claim 41, the controller is associated with at least one controllable parameter, the parameter being controllable in response to the health assessment signal (col. 6, lines 23-42, "The system apparatus...reducing pump wear.").

24. As for claim 45, Hays discloses the control and diagnostics system according to claim 41, further including at least one sensor, the sensor generating a signal indicative of a parameter associated with the motor, the health assessment signal is based on the sensor signal (col. 13, lines 7-18, "Diagnostic apparatus...impending maintenance.").

25. As for claim 46, Hays discloses the control and diagnostics system according to

claim 45, the controller includes a velocity feedback loop and a torque feedback loop (col. 13, lines 39-50, “Additional machine sensors...rotating machine 14.”).

26. As for claim 47, Hays discloses the control and diagnostics system according to claim 46, the velocity feedback loop generates a current reference signal in response to the sensor signal, and the torque feedback loop generates the driving output in response to the current reference signal (col. 13, lines 39-50, “Additional machine sensors...rotating machine 14.”).

27. As for claim 49, Hays discloses the control and diagnostics system according to claim 45, the motor parameter is one of a group consisting of velocity and vibration (col. 13, lines 7-18, “Diagnostic apparatus...impending maintenance.”).

28. As for claim 53, Hays discloses the control and diagnostics system according to claim 41, the diagnostics module includes an ASIC that generates the health assessment signal based on a process constraint (Fig. 4a).

29. As for claim 54, Hays discloses the control and diagnostics system according to claim 42, the health assessment signal is indicative of whether the motor is deviating from a normal operating characteristic (col. 6, lines 23-42, “The system apparatus...reducing pump wear.”).

30. As for claim 55, Hays discloses the control and diagnostics systems according to claim 41, further comprising a coordination module coupled to a plurality of the control and diagnostics systems, the coordination module alters the driving output associated with one of the control and diagnostics systems based on the driving output of another one of the control and diagnostics systems (col. 13, lines 39-50, "Additional machine sensors...rotating machine 14.").

31. As for claim 57, Hays discloses an integrated control and diagnostics system, comprising:

means for controlling a motorized system utilizing a health assessment signal indicative of the health of the motorized system (micro-controller/PID controller 188, Fig. 4a; col. 16, line 26 – col. 17, line 3; col. 20, lines 65-68); and

means for generating the health assessment signal, the means for generating integrated with the means for controlling (col. 16, lines 26-54).

32. As for claim 58, Hays discloses a composite control and diagnostics system to control a motor, comprising:

means for effectuating movement of the motor in a controlled fashion based in part on a health assessment signal (col. 16, lines 26-54; col. 20, lines 65-68);

means for formulating the health assessment signal, the means for effectuating movement and the means for formulating the health signal forming an integrated unit (Fig. 4a; col. 16, lines 26-54).

33. As for claim 59, Hays discloses an integrated control and diagnostics system, comprising:

means for diagnosing the health of a motorized system integrated with a means for controlling the motorized system, the means for diagnosing producing a signal (col. 16, lines 26-54; col. 20, lines 65-68); and

means for communicating the signal to the means for controlling (col. 20, lines 65-68).

34. **Claims 8, 9, 12-14 and 16-19** are rejected under 35 U.S.C. 103(a) as being obvious over Hays (US 6,260,004 B1), Grimm, further in view of Ogi et al (US 5,419,197) (hereinafter Ogi).

35. As for claims 8 and 12, although Hays discloses the use of artificial intelligence in control networks (col. 4, lines 41-52, "Recent published research...for pump maintenance."), Hays and Grimm do not specifically disclose a diagnostics system comprising at least one of a neural network or an expert system, wherein frequency spectral analysis is performed using the at least one of a neural network or expert system. Ogi teaches a diagnostics system comprising at least one of a neural network or an expert system, wherein frequency spectral analysis is performed using the at least one of a neural network or expert system (col. 2, lines 29-57, "In order to achieve...the lapse of time."; col. 4, lines 45-57, "Subsequently, the normalized...the power supply.").

It would have been obvious to one of ordinary skill in the art to modify Hays and Grimm by using a diagnostics system comprising at least one of a neural network or an expert system, wherein frequency spectral analysis is performed using the at least one of a neural network or expert system, because this would provide the advantage of an adaptable system that can be used with a variety of sensor and equipment types, as taught by Hays (col. 2, lines 18-28, "It is an object...the lapse of time.").

36. As for claims 9 and 13, Hays discloses a diagnostics and control system similar to claims 8 and 12, the controller provides a control signal to the motorized system according to at least one of a setpoint and the diagnostics signal (col. 14, lines 45-62, "In one embodiment...to rotating machine 14.").

37. As for claim 14, Hays discloses a diagnostics and control system similar to claim 12, the diagnostics system employs data fusion techniques in order to derive the at least one vibration signal from at least one sensor associated with the motorized system (col. 4, lines 41-52, "Recent published research...for pump maintenance.").

38. As for claim 16, although Hays discloses the use of artificial intelligence in control networks (col. 4, lines 41-52, "Recent published research...for pump maintenance."), Hays and Grimm do not specifically disclose a diagnostics system comprising a neural network adapted to synthesize a change in condition signal from the measured current. Ogi discloses a neural network adapted to synthesize a change in condition signal from

the measured current (col. 2, lines 29-57, "In order to achieve...the lapse of time."; col. 4, lines 45-57, "Subsequently, the normalized...the power supply."). It would have been obvious to one of ordinary skill in the art to modify Hays by using a diagnostics system comprising a neural network adapted to synthesize a change in condition signal from the measured current, because this would provide the advantage of an adaptable system that can be used with a variety of sensor and equipment types, as taught by Hays (col. 2, lines 18-28, "It is an object...the lapse of time.").

39. As for claim 17, Hays and Grimm do not specifically teach the use of a preprocessing portion operatively coupled to neural network nor a post processing portion coupled to the neural network for determining whether the change in condition signal is due to a fault condition. Ogi teaches the use of a preprocessing portion operatively coupled to neural network and a post processing portion coupled to the neural network for determining whether the change in condition signal is due to a fault condition (col. 4, lines 9-13, "A processor 10 further...digital computer.").

40. As for claim 18, neither Hays, Grimm nor Ogi specifically disclose the use of a fuzzy rule based expert system. "Official Notice" is given that both the use and advantages of fuzzy rule based expert systems are known and expected in the art. It would have been obvious to one of ordinary skill in the art to modify the teachings of Hays and Ogi by using a fuzzy rule based expert system because this would allow for making decisions based on general rules of diagnosis or control.

41. As for claim 19, Hays discloses a diagnostics and control system similar to claim 18, the diagnostics system detects at least one fault relating to the operation of the pump and at least one fault relating to the operation of the motor driving the pump according to the measured current (col. 12, lines 63-66, "Machine sensors may...rotating equipment 14."; col. 13, lines 7-12, "Diagnostic apparatus 24...variables thereto.").

42. **Claims 20-30 and 35** are rejected under 35 U.S.C. 103(a) as being obvious over Hays (US 6,260,004 B1), Grimm, further in view of Petsche et al (US 5,640,103).

43. As for claims 20-26 and 35, although obvious to one of ordinary skill in the art, Hays and Grimm do not specifically disclose obtaining a space vector angular fluctuation from a current signal relating to operation of the motor in order to detect a fault in the motor. Petsche teaches obtaining a space vector angular fluctuation from a current signal relating to operation of the motor in order to detect a fault in the motor (col. 3, line 52-col. 4, line 2, "In accordance with...the training phase."). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Hays and Grimm by obtaining a space vector angular fluctuation from a current signal relating to operation of the motor in order to detect a fault in the motor, because this would facilitate the detection and correction of motor faults, as taught by Petsche (col. 1, lines 8-19, "The present invention...or abnormally, respectively."). Furthermore, the

various modifications recited in claims 22-26 would be obvious to one of ordinary skill in the art because, as demonstrated by Petsche, the use of space vectors for representing and analyzing time-varying current signals is well known in the art.

44. As for claim 27, Hays discloses the diagnostics and control system of claim 26, the diagnostics system is adapted to analyze fluctuations in amplitude of the first spectral component in order to detect at least one fault associated with the motorized system (col. 1, line 48 - col. 2, line 14, "Monitoring machine performance...CSI Application paper....").

45. As for claim 28, Hays discloses the diagnostics and control system of claim 27, the first frequency is approximately twice the frequency of power applied to a motor in the motorized system (col. 1, line 48 - col. 2, line 14, "Monitoring machine performance...CSI Application paper....").

46. As for claim 29, Hays and Grimm do not specifically disclose the use of the Goertzel algorithm. "Official Notice" is given that both the use and advantages of the Goertzel algorithm are well known and expected in the art. It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Hays and Grimm by using a Goertzel algorithm to extract the amplitude of the first spectral component in order to analyze the amplitude of the first spectral component, because this is a well known method of spectral analysis.

47. As for claim 30, Hays discloses the diagnostics and control system of claim 29, the at least one fault comprises at least one of a stator fault, a rotor fault, and an imbalance in the power applied to the motor in the motorized system (col. 13, lines 7-18, "Diagnostic apparatus…impending maintenance.").

48. **Claim 48** is rejected under 35 U.S.C. 103(a) as being obvious over Hays (US 6,260,004 B1), Grimm, further in view of Gotou et al (US 4,933,834) (hereinafter Gotou). As for claim 48, Hays and Grimm do not specifically disclose the use of P-I controller to generate the current reference signal. Gotou teaches the use of a P-I controller in a velocity feedback loop to generate the current reference signal (col. 1, lines 13-31, "In conventional control systems…in recent years."). It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Hays and Grimm by using a P-I controller to generate the current reference signal in a velocity feedback loop, because PI controllers are widely used in motor control systems to improve robustness and suppress the influence of disturbances, as taught by Gotou (col. 1, lines 13-31, "In conventional control systems…in recent years.").

(10) Response to Argument

A. Rejection of Claims 1-7, 10-11, 15, 31-34, 36-37, 41-43, 45-47, 49, 53-55 and 57-59 Under 35 U.S.C. 103(a)

1. The Appellant asserts that Hays et al. and Grimm et al., either alone or in combination, do not teach or suggest each and every aspect set forth in the subject claims.

(1) Appellant argues that neither Hays et al. nor Grimm et al., either alone or in combination, teach or suggest these features of appellants' claimed invention.

Examiner's response (1): The examiner respectfully disagrees. Hays discloses a diagnostics system (col. 3, lines 21-46) integrated with the controller (micro-controller/PID controller 188, Fig. 4a; col. 7, lines 16-20, "diagnostics apparatus with controller"; col. 14, line 55 – col. 15, line 15) and the motor drive (fig. 27, "motor driver torque information"; col. 19, lines 1-16, "disconnecting motor, reducing power to a motor"; col. 23, lines 5-16, "motor supply sensor 90a, which may be a motor current or motor voltage sensor"; col. 27, lines 54-63) to comprise a single unit (10, fig. 1; col. 10, lines 18-33, "motor system designated generally 10"). In addition, Grimm discloses a diagnostics system (col. 1, lines 51-61, "recyclability of electronic motor can be determined"; col. 2, lines 27-32; col. 6, lines 1-3, "diagnostic terminal") integrated with the controller (col. 1, lines 20-30, "controlled product recycling") and the motor drive (3, 4, fig. 1) to comprises a single unit (20, fig. 1).

(2) Appellant argues that Hays et al. does not disclose a motor drive.

Examiner's response (2): The examiner respectfully disagrees. The

specification's background of invention of the present application on page 1, lines 18-27, which recites:

> Many industrial processes and machines are controlled and/or powered by electronic motors. Motorized systems include pumps providing fluid transport for chemical and other processes, fans, conveyor systems, compressors, gear boxes, motion control devices, screw pumps, and mixers, as well as hydraulic and pneumatic machines driven by motors. **Such motors are combined with** other system components, such as values, **pumps**, conveyor rollers, fans, compressors, gearboxes, and the like, **as well as with appropriate motor drives, to form industrial machines and actuators**. For example, **an electric motor may be combined with a motor drive providing electrical power to the motor**, as well as with a pump, whereby the motor rotates the pump shaft to create a controllable pumping system.

As described in the background of the invention of the present application above, the motor drive that provides electrical power to the motor is well known in the art. Furthermore, the claim language "motor drive" based on the appellant's assertion (appeal brief, page 7, lines 9-11) is just an interface, which provides motor current, voltage, and/or torque information to the diagnostics and control system. Therefore, the examiner interprets that an interface of Hays (36, fig. 2, "input/output"; fig. 27, "motor driver torque information"; col. 9, lines 19-37; col. 11, lines 25-51, "input/output device 36 transmits process variables received from process sensors to computing device 38"; col. 19, lines 1-16, "disconnecting motor, reducing power to a motor"; col. 23, lines 5-16, "motor supply sensor 90a, which may be a motor current or motor voltage sensor"; col. 27, lines 54-63) is equivalent to the claimed motor drive. In addition, Grimm discloses a terminal (3, 4, fig. 1), which provides power supply (12V D.C.) to a motor (1, fig. 1) through wire (22, fig. 1), is also equivalent to the claimed motor drive. The specification of the present application, on page 49, line 17 – page 50, which recite in part:

> Although the invention has been shown and described with respect to certain illustrated aspects, it will be appreciated that equivalent alterations and modifications will occur to others skilled in the art upon the reading and understanding of this specification and the annexed drawings. In particular regard to the various functions performed by the above described components (assemblies, devices, circuits, systems, etc.), the terms (including a reference to a "means") used to describe such components are intended to correspond, unless otherwise indicated, to any component which performs the specified **Function of the described component (e.g., that is functionally equivalent),** even though not structurally equivalent to the disclosed structure, which performs the function in the herein illustrated exemplary aspects of the invention.

Therefore, the interface in Hays and terminal in Grimm have the same functionality as the applicant claimed motor drive.

(3) Appellant argues that a motor drive as disclosed in appellants' disclosure, for example, provides electronic power to a motor. In addition, the motor drive as disclosed and claimed can for example provide motor current, voltage, and/or torque information to the diagnostics and control. It is thus submitted that Hays et al. does not provide the motor drive as recited in the subject claims, and in fact nowhere in Hays et al. is there mention of the utilization of a motor drive.

Examiner's response (2): In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., **<u>the motor drive as disclosed and claimed can for example provide motor current, voltage, and/or torque information to the diagnostics and control</u>**) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993). Furthermore, specification's background of invention of the present application

on page 1, lines 18-27, which recites:

> Many industrial processes and machines are controlled and/or powered by electronic motors. Motorized systems include pumps providing fluid transport for chemical and other processes, fans, conveyor systems, compressors, gear boxes, motion control devices, screw pumps, and mixers, as well as hydraulic and pneumatic machines driven by motors. **Such motors are combined with** other system components, such as values, **pumps**, conveyor rollers, fans, compressors, gearboxes, and the like, **as well as with appropriate motor drives, to form industrial machines and actuators**. For example, **<u>an electric motor may be combined with a motor drive providing electrical power to the motor</u>**, as well as with a pump, whereby the motor rotates the pump shaft to create a controllable pumping system.

As described in the background of the invention of the present application above, the motor drive that provides electrical power to the motor is well known in the art. Furthermore, the claim language "motor drive" based on the appellant's assertion (appeal brief, page 7, lines 9-11) is just an interface, which provides motor current, voltage, and/or torque information to the diagnostics and control system. Therefore, the examiner interprets that an interface of Hays (36, fig. 2, "input/output"; fig. 27, "motor driver torque information"; col. 9, lines 19-37; col. 11, lines 25-51, "input/output device 36 transmits process variables received from process sensors to computing device 38"; col. 19, lines 1-16, "disconnecting motor, reducing power to a motor"; col. 23, lines 5-16, "motor supply sensor 90a, which may be a motor current or motor voltage sensor"; col. 27, lines 54-63) is equivalent to the claimed motor drive. In addition, Grimm discloses a terminal (3, 4, fig. 1), which provides power supply (12V D.C.) to a motor (1, fig. 1) through wire (22, fig. 1), is also equivalent to the claimed motor drive. The specification of the present application, on page 49, line 17 – page 50, which recite in part:

> Although the invention has been shown and described with respect to certain

> illustrated aspects, it will be appreciated that equivalent alterations and modifications will occur to others skilled in the art upon the reading and understanding of this specification and the annexed drawings. In particular regard to the various functions performed by the above described components (assemblies, devices, circuits, systems, etc.), the terms (including a reference to a "means") used to describe such components are intended to correspond, unless otherwise indicated, to any component which performs the specified **Function of the described component (e.g., that is functionally equivalent),** even though not structurally equivalent to the disclosed structure, which performs the function in the herein illustrated exemplary aspects of the invention.

Therefore, the interface in Hays and terminal in Grimm have the same functionality as the applicant claimed motor drive.

(4) Appellant argues that nowhere in Grimm et al. is there a disclosure of a motor drive as recited in the claims at issue.

Examiner's response (3): The claim term "motor drive" based on the specification is just an interface, which provides motor current, voltage, and/or torque information to a motor. Grimm discloses a terminal (3, 4, fig. 1), which provides power supply (12V D.C.) to a motor (1, fig. 1) through wire (22, fig. 1), is equivalent to the claimed motor drive. Therefore, the terminal in Grimm has the same functionality as the applicant claimed motor drive.

B. Rejection of Claims 8-9, 12-14 and 16-19 Under 35 U.S.C. 103(a)

(1) Appellant argues that like the primary and secondary documents, Ogi et al. does not teach or suggest the motor drive as recited in appellants' claimed invention.

Examiner's response (1): Claims 8-9, 12-14 and 16-19 are properly rejected

under 35 U.S.C. 103(a) for the same reasons cited above with respect to independent claim 1.

C. Rejection of Claims 20-30 and 35 Under 35 U.S.C. 103(a)

(1) Appellant argues that claims 20-30 and 35 depend from independent claim 1 and 32 respectively, and Petsche et al. fails to make up for the aforementioned deficiencies with respect to Hays et al. and Grimm et al. with respect to the respective independent claims.

Examiner's response (1): Claims 20-30 and 35 are properly rejected under 35 U.S.C. 103(a) for the same reasons cited above with respect to independent claims 1 and 32.

D. Rejection of Claim 48 Under 35 U.S.C. 103(a)

(1) Appellant argues that claim 48 depends from independent claim 41, and Gotou et al. does not cure the aforementioned deficiencies with respect to the primary and secondary documents.

Examiner's response (1): Claim 48 is properly rejected under 35 U.S.C. 103(a) for the same reasons cited above with respect to independent claim 41.

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

Jungwon Chang

Conferees:

John Follansbee

JOHN FOLLANSBEE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100

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